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Polygonum Careyi, Olney. Sparingly in ditch along track of Hudson R. R. R., below Kings Bridge. Sept. 7, 1879, just in flower.

P. amphibium, L. With the above, and in flower a little in advance of it.

Betula nigra, L. A tree of four trunks, about 20 feet high, grows in low wood near the city limits, about $\frac{1}{2}$ mile east of Broadway.

B. lutea, Mchx. L. Several trees along a rocky stream between Williams Bridge and Woodlawn.

Zannichellia palustris, L. Marsh near Broadway, above Kings Bridge; also between this station and Morris' Dock.

Spiranthes graminea, Lind. *var. Walteri*, Gray. A single plant found in 1878, $\frac{3}{4}$ mile N. of Kings Bridge. Not since discovered.

S. simplex, [?] Gray. Several plants found on dry grassy ground in Woodlawn Cemetery. Had been in flower some time, Aug. 30, '79.

Calopogon pulchellus, R. Br. Rare; a single plant only.

Liparis liliifolia, Rich. Have found this plant at several localities, both close to the river, and two miles inland, sometimes growing quite abundantly. In flower, May 26, 1879.

Aplectrum hyemale, Nutt. Sparingly in Oliff Park, less than a mile N. W. of Jerome Park. May 1, 1879, full flower.

Cypripedium parviflorum, Salisb. June 1, 1879, a single plant in full flower near the City limits.

Smilax glauca, Walt. Not uncommon.

Polygonatum giganteum, Dietrich. At several localities.

Allium tricoccum, Ait. Found only in a glen by the river where it is not uncommon. A luxuriantly growing bed of these plants in full flower, July 22, 1879.

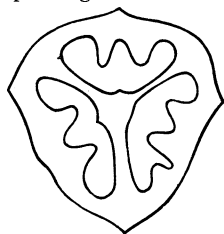
§ 41. Teratology.

The study of abnormal growth, besides affording excellent practice in the principles of morphology, is capable also of rendering very important assistance in tracing the derivation of forms, and perhaps in determining whether an existing form is an advance or retrogression. In the new edition of Gray's Text Book a sufficient sketch of the subject is given with reference to the special writers on the subject, but all its bearings have by no means been exhausted, and we are reminded by the following notes to call the attention of students to the close investigation of such cases, remarking that they are not the less interesting because they may have been observed before; in fact, that the frequent repetition of the phenomenon gives a better opportunity for exploring it.

Carya alba, Nutt.—The triangular or triqueous nuts of *Carya alba*, Nutt., noticed in the February BULLETIN by Mr. Britton, are very common here, some trees [*Carya alba* ?] yielding quite a percentage of the abnormal form. Possibly this form of nut may be more common here than at the East. H. C. B.

Painesville, Ohio.

(The nuts sent us, a cross-section of one of which we represent herewith, appear to be those of *Carya sulcata*.—Eds.)



Salix.—In a swamp willow found on the 4th of April, 1880, many of the catkins bore both fertile and infertile flowers. The catkins towards the top of the shrub—which was about 7 ft. high—as well as those along the ends of the lower branches, were normally staminate, those about the bases of the lower branches producing pistillate flowers. These appeared first at the base of the staminate catkin, varying from a few in this condition, to a fertile catkin bearing a few staminate flowers at its apex. Most of the ovaries were variously bent and distorted, and, being borne on what were originally the filament of stamens, were disproportionately long-pedicelled. Each bract of the catkin produced two of these long-pedicelled ovaries, instead of one as normally. The pedicels were sparingly villous either at their base or throughout their entire length.

Between the perfect stamen and the developed ovary, every degree of transition was to be observed, the general course of the transformation seeming to be as follows :

The ordinary two-lobed stamen assumed an abruptly acute or mucronate apex, lengthening into a style, the end of which first becoming granulated, developed a capitate stigma. Some anthers remained almost unchanged otherwise, while this was taking place, the result being an anther provided with a style and stigma. During, or succeeding this change, the green connective of the dorsal surface of the anther begins to widen, separating and encroaching on the yellow lobes of the anther, and pushing them around to the ventral surface, which thus becomes concave. The style also bends over in this direction. The outer or convex side is now entirely green in color, the inner or concave face bearing the two-lobed divisions of the yellow anther. The outermost of these lobes on each side become gradually obliterated, assuming the green color till the yellow of the former anther persists only as two narrow lines separated by a shallowing fissure in the floor of the convexity. This also soon relinquishes its color and adopts the green. The convex sides now grow around and together from the style downward, until finally we have the complete shell of a pistil, silky hairy on its external surface, and developed as from an ovate leaf. Within the base of this incipient ovary, through the ventral suture, I noticed in several cases that a small gland had appeared, similar to the glands at the base of the flowers. I was unable to determine what this represented. No ovaries were found further developed than this point. The shrub was left for a week until some of the catkins should become mature, but on my next visit the monoecious catkins had all fallen away, the staminate ones alone remaining, and I was only able to secure two or three imperfect specimens on which the above remarks are based.

During the course of these transformations some curious abnormalities occurred; for instance, several of the developing ovaries were noticed spirally twisted upon themselves, and one had bent into a right angle, two narrow approximate lobes of the anther still persisting, extending like a brace across the angle of the geniculated ovary, and in this novel position were discharging pollen. Perhaps I should have stated that the willow (*Salix discolor*?) was grow-

ing on the border of a reedy marsh at the foot of a sandy railroad embankment, the filling in of which had somewhat altered the natural soil, perhaps causing the peculiar freak above described.

EUGENE P. BICKNELL.

Riverdale, N. Y. City, *April 11*, 1880.

Salix and Rubus.—I have just sent you, by mail, some specimens showing a curious case of metamorphosis in *Salix* (*S. cordata*, Muhl?). They were collected near Plainfield, during May, 1879. The change of stamens into pistils is not, I believe, very rare in this genus, but here we have pistils passing into stamens through various gradations. There seems in these specimens to be a tendency in the ovary to separate into as many parts as there are stigmas, namely, four, forming as many imperfect ovaries; or one or more of the parts changing into stamens more or less perfect. The stalk of the ovary will thus often bear four branches, some of these being stamens and others ovaries. The anthers are sometimes attached to the side of an imperfect ovary.

I have also sent you a specimen of *Rubus Canadensis*? L., collected in a sandy field at Plainfield, during May, 1879. The flower has a strong tendency to revert to a leafy branch. The sepals are perfect leaves, are cut-serrate and even-lobed, and the stamens have changed into petals more or less perfect. All the plants growing near this one were found to have the same habit.

FRANK TWEEDY.

Maple with triple samara.—One of the sugar-maples in Broadway, Saratoga, has three keys to the fruit, in a large proportion of the latter. These keys are regularly disposed at an angle of 120° , and are in all respects normal, save as to number. All those collected by me had two or three seed-vessels excavated by a squirrel, and it turned out that the uninjured key was empty. The ordinary 2-keyed fruit of this species usually has one of the seeds abortive, and the squirrel is aware of this fact, though some of the books seem to have forgotten it.

The triple fruit of this tree is instructive as pointing to *Staphylea* (the bladder-nut), the horse-chestnut, and other allied genera which have fruit mostly with three divisions (or 2 or 1 by suppression). A 3-celled ovary is characteristic of Sapindaceae, to which these plants are now referred, and thus the triple samara of the maple may be regarded as not a case of pure monstrosity, as much as a reversion to the ordinal type. If it be true, as I was informed, that another tree near Saratoga presents the same peculiarity, the case is all the more striking, as showing a tendency towards reversion.

G. M.

Samaras of Maple.—*Acer dasycarpum*, Ehr., has nearly always one of its seeds and keys abortive. From one to six of the fruits in each raceme of *Acer Pseudo-Platanus* will usually be found to consist of three (very rarely four) samaras. The fruits at the base of the raceme, as well as the terminal one are those that generally exhibit this peculiarity.

W. R. G.